year the wings were finished, and on a morning appointed the maker appeared, furnished for flight, on a little promontory; he waved his pinions awhile to gather air, then leaped from his stand, and in an instant dropped into the lake. His wings, which were of no use in the air, sustained him in the water, and the Prince drew him to land half dead with terror and vexation."

These extracts show that Dr. Johnson had realised to some extent the difficulty of the problem to be solved; although Herr von Lilienthal's experiments, recently attempted by Prof. Fitzgerald, have to a certain extent falsified the universal application of his final catastrophe.

But, viewed with the cold calculating eye of mechanical science, the poetical descriptions are seen to be hopelessly absurd and impossible; now that Mr. Maxim has taken up the subject, and proved to demonstration the enormous power required, out of all proportion to the size, if man is ever to emulate the birds.

A. G. Greenhill.

NOTES.

The Organising Committee of the third International Zoological Congress, to be held at Leyden, September 16-21, has sent us a copy of the provisional programme. The programme contains some details with reference to the work proposed, not given in our previous notes on the forthcoming Congress. At the first general meeting, a discourse will be delivered by Dr. Weismann; Mr. Haviland Field's scheme for bibliographical reform will be reported upon by M. E. L. Bouvier; and a report on the prize instituted in 1892, at the Moscow meeting, will be made by M. Blanchard. At the second general meeting, Prof. Milne Edwards will give a discourse, and Dr. F. E. Schulze will propose the nomination of a commission of three members to draw up, in three languages, the code of zoological nomenclature. Dr. John Murray will address the third general meeting. With regard to the sections: up to the middle of July, the first section had been promised a communication on Weismanism, by M. A. Giard; on cellular theory, by Mr. A. Sedgwick; on Plankton studies, by Prof. Victor Hensen; and a paper by Dr. S. Apathy. Dr. Bowdler Sharpe will address Section II. upon the classification of birds; and there will be papers on the origin of the lacustrine fauna of European Russia, by Prof. N. Zograf (Moscow); on the fauna of Borneo, by J. Buttikofer; and on *Pithecanthropus erectus*, by Dr. E. Dubois. In the third section, Prof. W. Leche (Stockholm) will read an odontological paper, and there will also be papers by Prof. R. Semon (Jena) and Prof. O. C. Marsh. In the fourth section, papers referring to the classification of living and fossil invertebrates, and bionomy, will be read by Dr. V. Salensky, Dr. C. W. Stiles, M. Blanchard, and Prof. S. J. Hickson. The section of entomology has received papers by M. E. de Selys-Lonchamps, Father E. Wasmann, Dr. A. Fritze, and Prof. G. Canestrini. In Section VI., papers on the comparative anatomy and embryology of invertebrates will be read by A. de Korotnev, M. E. Perrier, Prof. J. W. Spengel, and Prof. Herdman. We understand that up to now the following delegates have been officially announced by the respective foreign Governments:—Belgium, Prof. Ed. van Beneden, Prof. Ch. van Bambeke, Prof. Gilson, and Prof. Lameere; France, Prof. Milne Edwards. MM. R. Blanchard, E. Bouvier, A. Certes, J. de Guerne, H. Filhol, Ch. Schlumberger, and L. Vaillant; Great Britain, Sir W. H. Flower, Prof. Sydney J. Hickson, Dr. J. Anderson, Dr. St. George Mivart, and Dr. P. L. Sclater; Sweden, Prof. F. A. Smith; Switzerland, Prof. Th. Studer, and E. Jung; United States (Department of Agriculture), Dr. C. W. Stiles.

A desire is widely felt among the pupils of Prof. Leuckart that the occasion of the fiftieth year of his doctorate should not pass without some durable mark of recognition from those who have known and valued his inspiring influence. It is proposed that the memorial should take the form of a marble bust, and an appeal for contributions is being circulated as widely as possible. There is naturally some difficulty in obtaining the addresses of all old pupils; and it is hoped that those who receive the appeal will make it generally known. Contributions should be sent to Herr Carl Graubner (C. F. Winter's Verlag, Leipzig, Johannes-gasse 8), who has consented to act as treasurer of the memorial fund.

It is proposed to honour Sir Joseph Lister by presenting his portrait to the Royal College of Surgeons for England, to be placed by the side of the portraits of John Hunter and other great surgeons of the past. On Tuesday last, in the presence of a large company, Sir Joseph was presented with a testimonial, in the form of a portrait of himself, subscribed for by his past colleagues and pupils, as a mark of esteem and admiration, on his retirement from the chair of clinical surgery at King's College Hospital.

The sixty-third annual meeting of the British Medical Association was opened on Tuesday, when Dr. E. Long Fox retired from the presidential chair, and Sir J. Russell Reynolds was installed as his successor. Dr. Ward Cousins, in moving the report of the Council, said that when they last met in London, in 1873, they numbered only 1500, whereas now their membership exceeded 16,000. The financial position of the Association is most satisfactory, the assets exceeding the liabilities by more than £60,000. In his opening address, Sir Russell Reynolds dwelt chiefly upon the great advances that have been made, during the past twenty years, in the elucidation of both structure and function—such, for example, as in the researches upon the thyroid, the adrenal bodies, the spleen, and the liver; the advance of bacteriology; the function of the axis-cylinder of nerves; and the development of a new field of therapeutics in the serum-treatment of disease.

The death is announced of Prof. H. Witmeur, Professor of Mineralogy and Geology in the University of Brussels, and of Prof. Josef Loschmidt, at Vienna.

Sir John Tomes, F.R.S., died at Caterham on Monday, at eighty years of age. He was elected into the Royal Society in 1850, after carrying out valuable work referring to dental physiology and surgery. In 1883, with the late Prof. Huxley, he was elected an honorary fellow of the Royal College of Surgeons; and three years later the honour of knighthood was conferred upon him, in recognition of his services to his profession.

We have already noted that an international conference for the protection of birds useful in agriculture, by helping to destroy injurious insects, has recently been held in Paris. Most of the countries in Europe were represented at the conference; and it was agreed that various measures should be taken to preserve useful birds, and to protect their nests and eggs from destruction. A list of birds considered useful has now been published by the Commission, and as this includes a number of our caged friends as well as other birds at present ruthlessly sacrificed for ornamental purposes, the trade in birds in various directions will naturally be curtailed. We learn from the *Révue Scientifique* that a period of three years is to be accorded to the different countries of Europe to allow them to arrange their laws in accordance with the principles agreed upon by the International Commission.

The prospectus is issued of a proposed complete directory of living botanists of all countries, inclusive of the officers of botanic gardens, institutes, and societies, as also of their works and the botanical papers issued by them. Any communication should be made to Herr J. Dörfler, III Barichgasse 36, Vienna, of the botanical section of the Imperial Museum of Natural History.

MR. F. T. COVILLE, the honorary curator of the Department of Botany of the United States National Museum, issues an appeal for information on the aboriginal uses of plants by the natives of North America, accompanied by instructions as to the collecting of specimens, and the arrangement of the information under various heads.

WE learn from the *Botanical Gazette* that the Division of Vegetable Physiology and Pathology in the United States Department of Agriculture has had under cultivation during the past year over 1000 varieties of wheat and oats. The grains have been collected from nearly all parts of the world, and have been grown chiefly for the purpose of obtaining information upon their rust-resisting qualities. Numerous crosses have been made, and material and facts obtained which will be used in further work.

A VALUABLE memoir on the earthquakes of the Philippine Islands has recently been published by P. Miguel Saderra Masó, the director of the seismic section of the Observatory of Manila. The work consists of 122 quarto pages, and is illustrated by 48 plates, representing the instruments used in the observatory, the disturbed areas and isoseismal lines of sixty-one important earthquakes, and copies of some of the seismographic records, one of them somewhat resembling a bank manager's signature. With a seismological observatory so well equipped as that of Manila, a network of seismic and meteorological stations already established over the country, an energetic and capable director, and numerous shocks, the Philippine Islands promise to become as important a district for studying earthquakes as the neighbouring empire of Japan.

SOME beautiful enlargements of phonograph traces are given by Dr. John G. McKendrick in the *Journal of Anatomy and Physiology*, illustrating his paper "On the Tone and Curves of the Phonograph." The accuracy of the phonograph records is strikingly exemplified by the traces of four Koenig tuning-forks, giving 64, 128, 256, and 512 vibrations per second respectively. In each case, the length of indentations is half of that of the previous set, and they are of the same character. Traces of the sounds of a violin, flute, organ, military band, and human voice, singing and speaking, are reproduced. But these traces do not show the exact motion of the vibrating disc. To exhibit this, the phonograph traces were converted into curves by a lever arrangement. The lever ended in a fine point of a hard needle, which translated the up-and-down motion of the reproducing style into a to-and-fro wave motion. To get rid of all disturbing vibrations due to the needle itself, the latter was firmly fixed in a lead block to which the reproducing style was attached, and the phonogram cylinder was turned so slowly that its motion was almost imperceptible to the eye. By this contrivance the uniform curves due to a tuning-fork, the smooth notes of a piccolo, the strong undulations of a bassoon, and the highly over-toned ripples of an old English coach horn were very effectively made visible to the eye.

A RECENT number of *Modern Medicine and Bacteriological Review* contains an article on Prof. Bunge's important paper on the therapeutic value of iron, read at the German Congress of Internal Medicine last spring. An interesting table is quoted showing the amount of iron found in various food substances. Spinach contains considerably more iron than the yolk of eggs, whilst the latter, again, is superior in this respect to beef, next in order coming apples, lentils, strawberries, white beans, peas, potatoes, wheat, &c., and almost at the bottom of the list we find cow's milk. That this article of food, of such great importance in infant life, should contain so small a quantity of iron, led Prof. Bunge to conduct a series of experiments on animals, to ascertain in what quantity iron was present in the system of animals of different age. The interesting fact was established that younger animals contain a much greater quantity of iron than adult animals, that the body of a rabbit or a guinea-pig, for example, one hour old, was found to contain more than four times as much iron as that of similar animals two and a half months old. Prof. Bunge is of opinion that a long-continued exclusive milk diet for infants is not advantageous, but should be supplemented by the addition of wheat preparations. Strawberries and apples, however, become invested with fresh attractions by the light of these investigations. The writer of the article suggests that reform is required in the administration of iron, and that the immense quantities of iron in the shape of tonics, which custom prescribes for patients, may very possibly, in a large number of cases, only serve to increase the discomfort of the invalid by the disturbance caused in the digestive functions of the body. In conclusion the hope is expressed that Prof. Bunge's valuable results will "set physicians to thinking more of materia alimentariæ, and less of materia medica"!

THE *American Naturalist* for July contains a statement of the advantages offered for scientific study by the Missouri Botanical Garden at St. Louis, and by the Hopkins Seaside Laboratory, situated at Pacific Grove on the coast of California, and maintained by the Leland Stanford Junior University.

QUAIN'S "Elements of Anatomy" (Longmans, Green, and Co.) is now in its tenth edition. The second part of the third volume, which has just been published, comprises the descriptive anatomy of the cerebro-spinal and sympathetic nerves, and their ganglia. It is by Prof. G. D. Thane, who, with Prof. Schäfer, edits the edition.

WE have received the first part of a new monthly microscopical journal, the *Zeitschrift fur angewandte Mikroskopie*, edited by G. Marpmann, and published by Thost, of Leipzig. It will be especially concerned with technique and methods. The present number contains papers on a new species of *Scenedesmus*, by P. Richter; on modern imbedding materials, by the editor; on the fixing of spores and pollen in glycerin, by H. Reichelt; and a number of reviews and notes.

THE Central Meteorological Institute of Finland has just issued vol. xii. (new series) of its observations for the year 1893. This service is one of the oldest, having been established about 1844, and reorganised, under the superintendence of the Society of Sciences of Finland, in 1882. Among its earlier publications there is a series of eye observations taken at twenty minutes interval, from March 1848 to December 1856, before the establishment of self-registering instruments, a labour which is probably without a parallel. The present volume contains hourly observations for Helsingfors, particular attention being paid to the character and motion of clouds, and to atmospherical electricity.

THE eighth volume of the late Prof. Cayley's "Collected Mathematical Papers" has just appeared. The volume contains seventy papers, numbered from 486 to 555, published for the most part in the years 1871–73, and runs into 570 pages. In a prefatory note, Dr. A. R. Forsyth, the editor of this and the remaining volumes, says that Prof. Cayley had himself passed the first thirty-eight sheets for press, and prepared one note. The actual manuscript of this note, which was one of the last of Cayley's writings, is reproduced in fac-simile in the present volume, upon the kind of paper which he regularly used during his mathematical investigations. The remaining papers will appear without notes and references. The long biographical notice of Cayley, contributed by Dr. Forsyth to the *Proceedings* of the Royal Society, is reprinted in the volume just published.

THE sixth annual report of the Missouri Botanical Garden bears witness that useful work was accomplished during last year.

In addition to the necessary routine work, several researches were carried out, and the results of some of these investigations are embodied in the report. Mr. M. A. Brannon, who occupied the Garden's table at the Wood's Holl Marine Biological Laboratory, has his studies on *Grinnellia* nearly ready for publication. The Director, Mr. W. Trelease, has made a large collection of the flora of the Azores, and is now working at it. The collection fully represents the flora of those islands, and adds somewhat to what is known of the distribution of species through the group. The papers included in the present report are:—"Revision of the North American Species of Sagittaria and Lophotocarpus," by Mr. J. G. Smith, who also describes a few new or little known species; "*Leitneria Floridana*," by Mr. Trelease. "Studies on the Dissemination and Leaf Reflection of *Yucca aloifolia* and other Species," by Mr. H. J. Webber; and "Notes on the Mound Flora of Atchison County, Missouri," by Mr. B. F. Bush. The report is illustrated by sixty excellent plates.

The additions to the Zoological Society's Gardens during the past week include a Rhesus Monkey (*Macacus rhesus*, ♀) from India, presented by Captain Fitzgerald; a Common Marmoset (*Hapale jacchus*) from South-East Brazil, presented by Mrs. Florence Cowlard; a Serval (*Felis serval*), a White-necked Stork (*Dissura episcopus*), a Vociferous Sea Eagle (*Haliætus vocifer*), an Antarctic Skua (*Stercorarius antarcticus*) from Mozambique, presented by Mr. W. A. Churchill; a Cardinal Grosbeak (*Cardinalis virginianus*) from North America, a Lazuline Finch (*Guiraca parellina*) from Mexico, presented by Miss E. A. Krumbholz; an Orbicular Horned Lizard (*Phrynosoma orbiculare*) from California, presented by Miss Mabel Baker; a Frilled Lizard (*Chlamydosaurus kingi*) from Roebuck Bay, West Australia, presented by Mr. Saville-Kent; an Orang-outang (*Simia satyrus*, ♀) from Borneo, three Pratincoles (*Glareola pratincola*), European, an Eyed Lizard (*Lacerta ocellata*) from North Africa, a Brazilian Tortoise (*Testudo tabulata*), a Black Tortoise (*Testudo carbonaria*) from Brazil, deposited; two Plumed Ground Doves (*Geophaps plumifera*), bred in the Gardens.

OUR ASTRONOMICAL COLUMN.

Terrestrial Helium.—The discovery by Messrs. Runge and Paschen of the duplicity of the bright yellow line seen in the spectrum of the gas obtained from cleveite, and of its apparent non-coincidence with the solar D_3 line, as announced in Nature of June 6, has naturally led to the re-observation of the solar line.

Mr. Lockyer informs us that on June 14, observing in the fourth order spectrum of a grating having 14,438 lines to the inch, he found the D_3 line in the chromosphere to have a considerable breadth with rather uncertain indications of doubling, while in the spectrum of a prominence the line was much better defined, and was distinctly double, the less refrangible component being the fainter, as in the case of the gas from cleveite.

Writing under date June 25 (*Ast. Nach.* 3302), Prof. G. E. Hale gives a preliminary account of the observations he has made with the powerful spectroscope of the Kenwood Observatory. To eliminate the effect of the sun's rotation in displacing the lines, observations were made of the chromosphere at the sun's north and south poles.

On June 19 and 20 the chromospheric line was found to be 0·54 tenth metres broad, the wave-length of the middle being determined as 5875·924. In the spectrum of each of two prominences observed on June 20 and 21, an inconspicuous bright line was detected on the less refrangible side of D_3, both lines being narrow and sharp, and the distance between them being 0·357 tenth metres. The absence of metallic lines, other than H and K, indicated that the fainter line was probably not due to the accidental proximity to D_3 of a faint metallic line. Further observations on June 24 showed that the broad line in the chromosphere was also divisible into two parts, and it became evident that the wave-length of the D_3 line determined on June 19 and 20, as well as that determined by Rowland, must be affected by an error on account of the presence of the faint line on the less refrangible side. So far, Prof. Hale has not succeeded in obtaining a measure of the wave-length of the more refrangible and brighter of the solar D_3 lines, considered as a separate line.

The results so far obtained may be stated as follows:—

λ of solar D_3 line (Rowland)	5875·982
,, ,, ,, (Hale)	5875·924
,, brightest component of terrestrial line (Runge and Paschen)	5875·883
Distance apart of components of terrestrial line (Runge and Paschen)	0·323
Distance apart of components of solar D_3 (Hale)	0·357

The wave-length of the brighter component of the solar D_3 line remains to be determined before the question of the identity of the solar and terrestrial gas can be regarded as completely set at rest.

The announcement that the yellow line of the gas from cleveite was double, also led Dr. Huggins to observe the chromospheric line. In his first attempts he failed to see the line double (*Chemical News*, No. 1855), but he now states that he clearly saw the line to be double on July 10, 11, and 13, the less refrangible line being the fainter, and the distance apart of the lines being about the same as that of the lines in the cleveite gas according to Runge and Paschen (*Ast. Nach.* 3302).

It is worth recalling that Belopolsky observed the solar D_3 line to be double in May 1894, and ascribed the appearance to the superposition of a telluric line upon the bright line. Prof. Hale's observations demonstrate very clearly that Belopolsky's explanation cannot possibly account for the doubling of the line as observed by him.

Ephemeris for Barnard's Comet, 1884 II.—The following search ephemeris for the return of this comet is due to Dr. Berberich (*Ast. Nach.* 3301):—

	R.A.			Decl.	
	h.	m.	s.	°	′
Aug. 2	2	23	9	+ 12	29
6	2	29	7	13	19·5
10	2	34	30	14	6·8
14	2	39	16	14	50·9
18	2	43	23	15	31·9
22	2	46	48	16	9·7

The positions are for Berlin midnight, and are computed on the assumption that the comet will pass through perihelion on June 3. On June 30, Swift discovered a nebulous object in R.A. 20°, decl. + 2° 55′, which was missing on July 4, and was thought to be a possible return of the comet for which the ephemeris is given above. Dr. Berberich states that the observation by Swift does not fit closely into the orbit.

The August Meteors.—Shooting stars from various radiants appear during the month of August; but the most important shower is that of the Perseids. These are visible for a considerable period, with a maximum on August 10. According to Mr. Denning, the radiant point exhibits an easterly motion among the stars; on the 10th it is situated in R.A. 45°, decl. 57° N.; on August 2 it is in R.A. 36°, decl. 55°, and on August 16 in R.A. 53°, decl. + 58°. The density of the shower varies but little from year to year, the number of meteors seen by one observer on the morning of August 11 being from sixty to eighty. Unfortunately the moon rises about nine o'clock on the 10th, so that this year only the brighter meteors will be visible.

THE SUN'S PLACE IN NATURE.[1]

IX.

In most of the earlier attempts which were made to explain the origin of new stars, the leading idea was that of a single body being suddenly disturbed in some way, with the possible result that the heat of its interior became manifested at the surface. Thus Zöllner, in 1865, suggested that the phenomena might be

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[1] Revised from shorthand notes of a course of Lectures to Working Men at the Museum of Practical Geology during November and December, 1894. (Continued from page 255).